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$$x = X - Y,$$

$$y = 875 - 4X - 2Y,$$

$$w = Y;$$

which give, since $w + x + y + z = 250$,

$$z = 3X + 2Y - 625.$$

All values of x, y, z, w, may be obtained from these by assigning integral values to X and Y. In order that x, y, z, w, shall be positive certain restrictions must be put on the values of X and Y. These restrictions are most easily understood when the pairs (X, Y) are taken as the coördinates of a point in the plane. It thus appears that the points (X, Y) available for our problem must lie in or on the boundaries of a quadrilateral enclosed by the four lines: $Y = 0$, $X - Y = 0$, $875 - 4X - 2Y = 0$, $3X + 2Y - 625 = 0$. The number of points with integer coördinates in this region will be approximately equal to the area of the quadrilateral which is found to be 2930. If Mr. Uhler's enumeration is correct this result is in error by 36. The actual number might be obtained by counting the number of lattice points in this quadrilateral.

The method applies as easily to problems involving a greater number of variables. Instead of areas one will have to consider volumes in space of three or more dimensions.

PROBLEMS FOR SOLUTION.

2784. Proposed by T. H. GRONWALL, New York City.

Show that all solutions in integers of $y^2 = 1 + x + x^2 + x^3 + x^4$ are given by

$$\begin{array}{llll} x = -1, & 0, & 3; \\ y = \pm 1, & \pm 1, & \pm 11. \end{array}$$

2785. Proposed by W. H. ECHOLS, University of Virginia.

If on the sides, as bases, of any closed plane polygon, there be constructed similar triangles similarly placed, all outward or all inward, then the centroid of the vertices of these triangles coincides with the centroid of the corners of the polygon.

2786. Proposed by R. A. JOHNSON, Hamline University.

At what angle should the face of a golf club (driver) be laid back, in order to secure the maximum distance of flight? Show that, under certain assumptions, the angle should be 15°.

2787. Proposed by WARREN WEAVER, University of Wisconsin.

In the gambling game known as "craps," two dice are thrown. The one throwing the dice makes a bet which is covered by an equal amount by one or more players opposing him. If he throws on the first throw a sum of seven or eleven he wins at once; if he throws a sum of two, three, or twelve he loses at once; if he throws any other sum he continues throwing until he either duplicates his original sum, and wins, or throws a sum of seven and loses. Show that the probability that the one who is to throw the dice will win is 0.49847, so that the game would be very nearly fair if one person were to throw the dice continuously instead of changing about, as is actually done.

Note.—Compare the article on "Probabilities in the game of 'Shooting Craps'" published elsewhere in this issue of the MONTHLY.—Editor.